

Remarks

General:

Claims 10-18 are pending in the application. Claims 10-18 are rejected. Claim 16 is canceled. Claims 10, 12, and 17 are amended as discussed below. Claim 19 is new.

No new matter is added by this amendment.

Drawings:

The drawings are objected to on the ground that “reference character ‘16’ has been used to designate both channel and blades.” The objection is traversed. The blades are designated “2.” The outlet channel is designated “16.” No instance can be found where the reference numeral “16” has been used to designate the blades. (The description of FIGS. 3 and 7 uses the phrase “16 blades,” but in that context “16” is an actual number, not a reference character.)

The drawings are objected to “under 37 CFR 1.83(a) because they fail to show reference character 1 as described in the specification.” The objection under 37 CFR 1.83(a) is traversed. No essential structural detail that is not shown in the drawings can be identified. In particular, the rotor 1 is clearly visible in FIGS. 1, 2, 3, 4, 5, and 8, and part of the rotor is visible in FIGS. 6 and 7. The objection (which would actually arise under 37 CFR 1.84(p)(5)) that the drawings fail to show reference character 1 is traversed. The reference character 1 appears in FIGS. 2, 3, 5, and 8. The use of multiple arrows in association with the reference character 1 in FIGS. 2, 5, and 8, to emphasize that the reference character 1 applies to an assembly occupying a large section of the drawing, is not actually forbidden by 37 CFR 1.84(r)(1).

35 USC § 112:

Claims 12-18 were rejected because of difficulties with the expression “bladed wheel” in claim 12. The expression has been deleted as redundant of the recitation in claim 10 that the wheel comprises blades, and the rejections are therefore moot.

The rejection of claim 14 is traversed. See, for example, FIG. 6, which clearly shows blades 2 mounted between and supported by untoothed discs 5.

Claim 15 was rejected on the ground that the antecedent for “the discs” was not clear. Claim 15 now recites the exact expression “support discs” that provides antecedent in claim 12.

Claim 16 was rejected on the ground that “the disclosure fails to describe how the device operates in a reversible manner. Therefore, one skilled in the art cannot make and/or use the invention as claimed.” The applicants do not agree, see page 4, lines 18-27 of the English translation, but in the interests of speedy prosecution claim 16 has been canceled, and the rejection is therefore moot.

Claim 17 was rejected on the ground that the “lift-type means” was not disclosed. The rejection is traversed. The examiner’s attention is drawn to page 4, lines 8-17 and page 8, lines 22-24 of the authentic PCT text (page 5, lines 7-17 and page 10, lines 28-30 of the English translation) and FIG. 3 of the drawings, which provide a detailed explanation of how to lift fish from the downstream to the upstream side of the wheel. On reviewing the authentic text, however, it is considered that the original “faire office d’ascenseur” or “caractérisée par la fonction d’ascenseur” might better be expressed in American English as “serving as an elevator¹,” and the claim has been amended accordingly.

35 USC § 102 and § 103:

Claim 10 requires a fixed part located inside the rotatable wheel and serving as a dam to retain a water level “for capturing the potential energy of water.” As is explained in the specification, see, for example, page 2, lines 1-4 and 29-31, and page 4, lines 20-21 of the English translation, the dam function permits only a slight amount of leakage between the rotor

¹ The original translation was written in English English, which uses the noun “lift” where American English uses the noun “elevator.”

blades 2 and the dam 4. Applicants' dam conserves water, and allows the potential energy from a low head, as well as any kinetic energy in water flow, to be extracted. None of the cited references discloses or suggests a structure that is capable of acting as a dam within a rotatable wheel. All of the cited devices are either overshot wheels in which the water supply is controlled by a separate dam external to the wheel, or wheels wholly immersed in the fluid, for which a dam would not be applicable. The prior art rejections are therefore traversed. In more detail:

35 U.S.C. 102:

Claims 10, 12, 14, 15, and 16 were rejected as anticipated by U.S. Patent No. 5,642,984 (Gorlov). The rejection is traversed. Claim 10 requires a fixed part located inside the rotatable wheel and serving as a dam to retain a water level "for capturing the potential energy of water." As is explained in the specification, see, for example, page 2, lines 1-4 and 29-31, and page 4, lines 20-21 of the English translation, the dam function permits only a slight amount of leakage between the rotor blades 2 and the dam 4. Applicants' dam conserves water, and allows the potential energy from a low head, as well as any kinetic energy in water flow, to be extracted. The distributor 206 of Gorlov, in contrast, leaves a considerable open space between itself and the blades 202, and allows the water to flow freely past the blades. That works for Gorlov's device, which is designed for use in open water, and works on a fundamentally different principle from Applicants' device. Gorlov's distributor cannot act as a dam, and cannot capture potential energy. Thus, Gorlov neither discloses nor fairly suggests a device having all the features of claim 10, and claim 10 is believed to be not only novel but also non-obvious over Gorlov.

Claims 10, 12, 14, 15, 16, and 17 are rejected as anticipated by U.S. Patent No. 5,503,530 (Walters). The rejection is traversed as based on a misunderstanding of Walters's disclosure. The inner part 4, 5 is in fact the operative part of the rotor 1, see col. 3, lines 10-14. The outer part 9 is in fact part of the fixed frame 8, see col. 3, lines 25-28. In any case, Walters's device is a free-standing vertical-axis wind turbine, and of its very nature allows the wind to blow round it, so the provision of a dam would be completely inapplicable. Thus, Walters neither discloses nor fairly suggests a device having all the features of claim 10, and claim 10 is believed to be not

only novel but also non-obvious over Walters.

Claims 10-18 are rejected as anticipated by U.S. Patent No. 5,440,175 (Mayo et al.) The rejection is traversed. The part 30 of Mayo is not capable of acting as a dam.² First, the generator 30 spans only a minor portion of the axial length of the waterwheel, see FIG. 2. Second, there is a large radial space between the housing 32 of the generator 30 and the inside of the blades 10, see FIGS. 1 and 3. Third, the generator 30 is within the solid tube 8, see FIG. 3, and cannot act as a dam because it has nothing to dam. In fact, Mayo shows a device with the blades 10 mounted on a rotating cylinder 8. As explained in the specification (page 1, lines 27-32 of the English translation), that is different from (and not as good as) applicants' device with a stationary dam. In fact, however, Mayo's device is an overshot wheel, where the issue of damming the water within the wheel does not arise, because there is no water to dam there. (The effective dam in operation of Mayo is the lip of chute 60, see col. 4, lines 63-68.) Thus, Mayo neither discloses nor fairly suggests a device having all the features of claim 10, and claim 10 is believed to be not only novel but also non-obvious over Mayo.

35 U.S.C. § 103:

Claims 10-13, 15-18 are rejected as obvious over U.S. Patent No. 973,869 (Logan) in view of Gorlov. The rejection is traversed. Logan, like Mayo, shows a turbine with buckets 21 fixed to a rotating drum 16, and does not show a fixed dam as claimed. In addition, Logan's device is a vertical-axis turbine, designed to rotate in the same direction regardless of which way the water is flowing past it. Logan uses the gates 24 to ensure that the primary flow of water is to the correct side of the shaft 17, but accepts some flow to the "back" side (described at page 2, lines 22-23 as "comparatively" still). The buckets 21 are designed to collapse partially, in order to reduce their drag on the "back" side. Thus, the drum 16 cannot act as a dam, and cannot capture potential energy, because water can flow round the back side of the turbine. The Office action contends that "it would have been considered obvious ... to modify Logan to include the

² The element 30 is actually a "generator." It is probably more correct to consider element 32, which is the "housing" containing the generator.

fixed part as taught by Gorlov in order to control fluid flow.” Even if that modification were obvious, it still would not result in the invention claimed, because the fixed drum of Gorlov would not serve as a dam any more than the rotating drum of Logan. In fact, however, absent any reason to suppose that in Logan’s device a stationary diverter would control fluid flow better than a rotating diverter, it would not have been obvious to a person having ordinary skill in the art to make the change.

For all of the above reasons, claim 10 is believed to be both novel and non-obvious over the cited references. However, in the interests of speedy prosecution, claim 10 has been further amended to state explicitly that the axis of the rotatable wheel is horizontal rather than vertical, thereby pointing out an additional distinction over Walters, Logan, and certain embodiments of Gorlov.

Claims 11-15 and 17-18 are dependent from claim 10 and, without prejudice to their individual merits, are deemed to be novel and non-obvious for at least the same reasons as claim 10. In addition, however, it is noted that only Mayo and Logan appear to be relied on against the features of claim 11. In Mayo, it is conjectured that the dam 44 is identified as a “lower fixed part” but the dam 44 does not channel water flowing into the wheel. In Logan’s vertical-axis tide-mill, it is not clear what part should be identified as the “lower fixed part” of claim 11. However, the opportunity has been taken to add new claim 19 reciting more explicitly the cooperation between the lower fixed part and the dam within the hollow wheel. Support for claim 9 is found at least at page 2, line 29 of the English translation.

Only Walters, Mayo, and Logan appear to be relied on against the features of claims 17 and 18. Absent any explanation of how a vertical-axis turbine or an overshot wheel could act as an elevator for fish, the rejection of these claims is traversed on the ground that no *prima facie* case of anticipation or obviousness can be discerned.

For these reasons also at least claims 11 and 17-19 are deemed novel and non-obvious over the cited references.

Conclusion:

In view of the foregoing, claims 10-15 and 17-19 are deemed to be in order for allowance. Reconsideration and withdrawal of the examiner's objections and rejections and an early notice of allowance of all claims are earnestly solicited.

Respectfully submitted,

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